

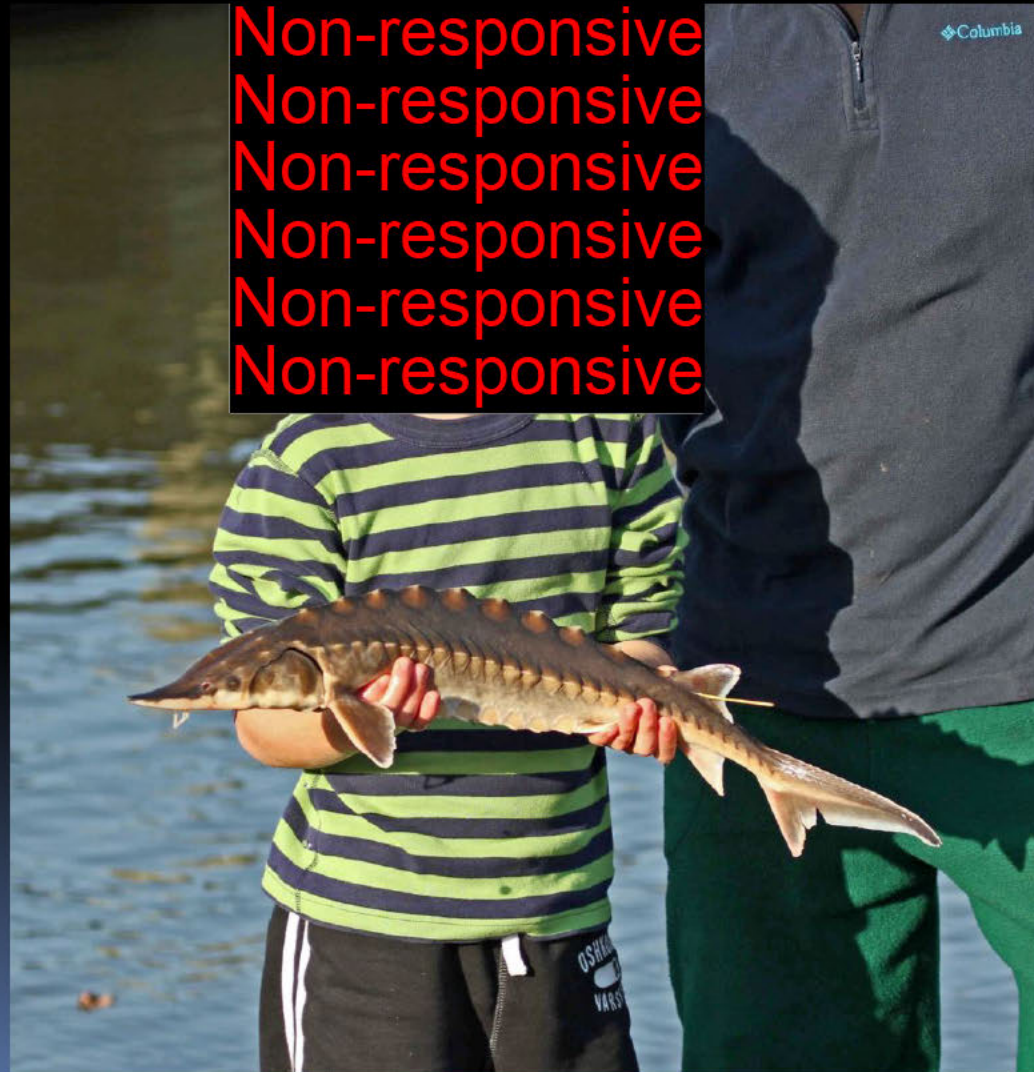
Atlantic Sturgeon Tracking in the Lower Chesapeake Bay

Christian Hager and Carter Watterson





NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY



Non-responsive
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Non-responsive



NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY





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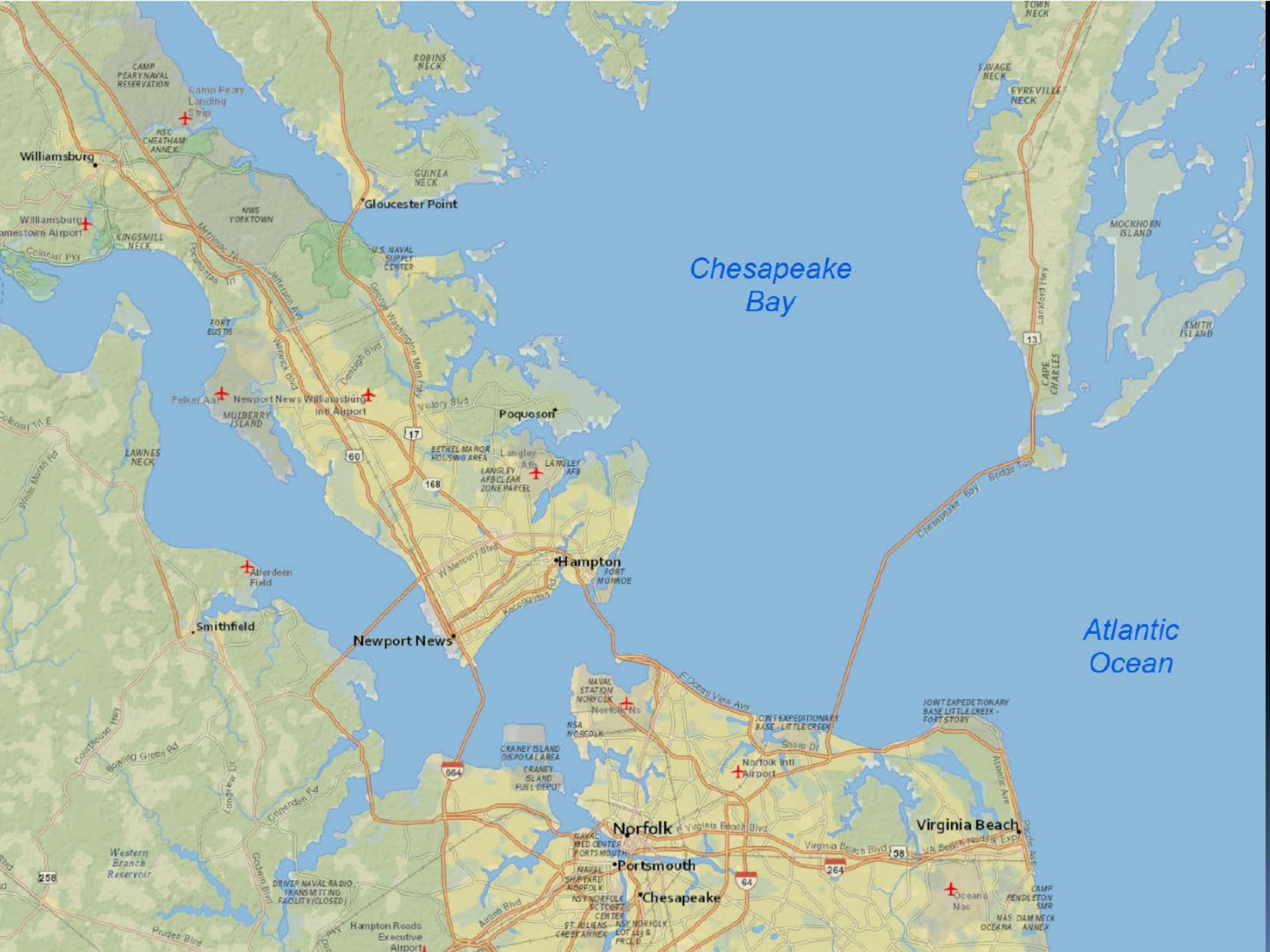


Atlantic sturgeon can grow up to 14 feet and weigh in excess of 800 pounds



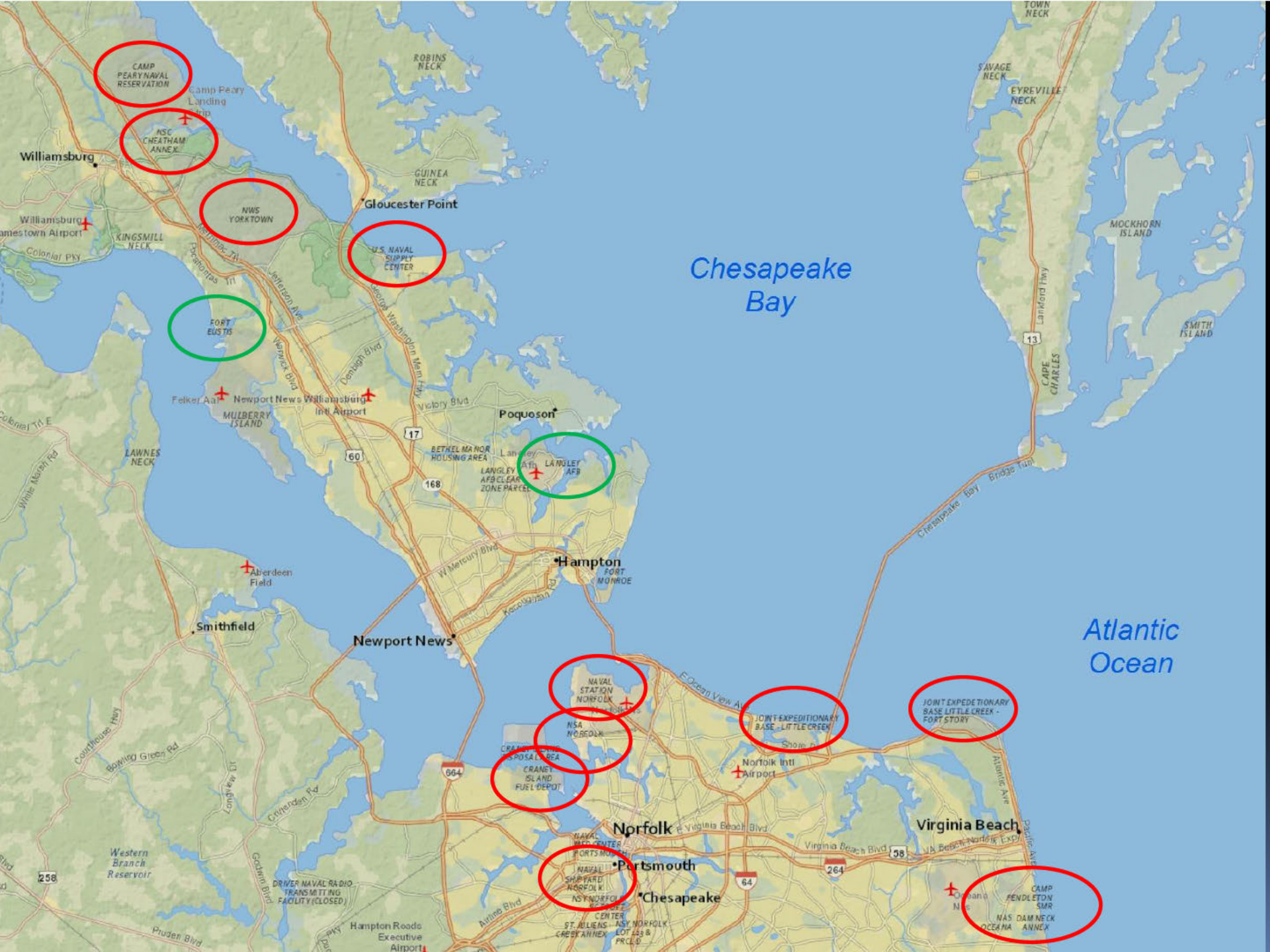
NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

- **Atlantic sturgeon were listed under the ESA on 31 January 2012**
- **As part of the this listing, the Chesapeake Bay distinct population segment was listed as endangered**



Chesapeake Bay

Atlantic Ocean



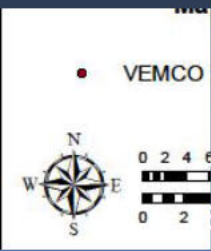


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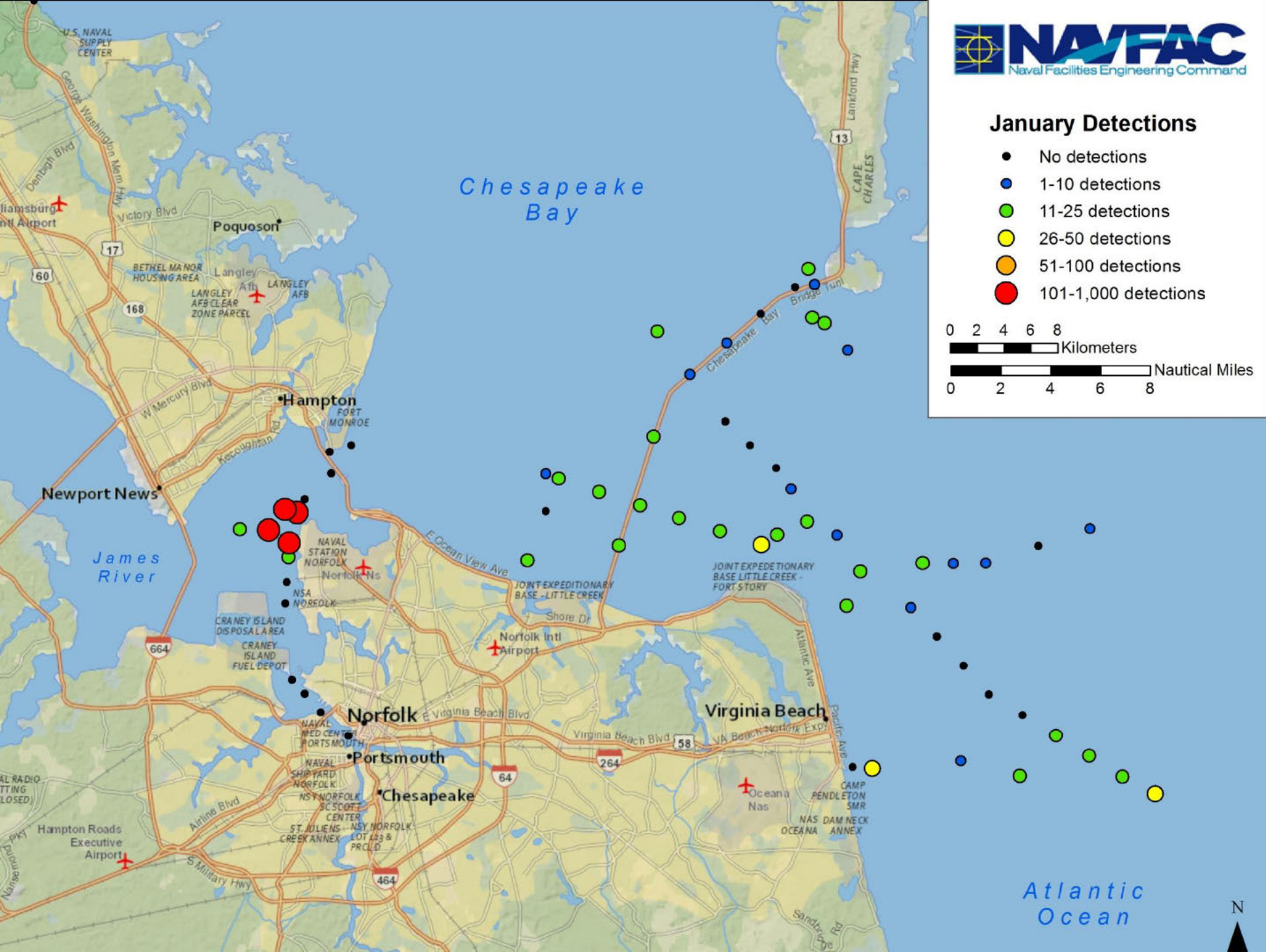
- **When are sturgeon present within the Bay?**
- **What areas of the Bay are they utilizing?**
- **How long are they staying at any given location?**
- **What are their seasonal movement patterns?**
- **What are the areas and periods of overlap between the Navy's and the sturgeon's use of the Bay?**



NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

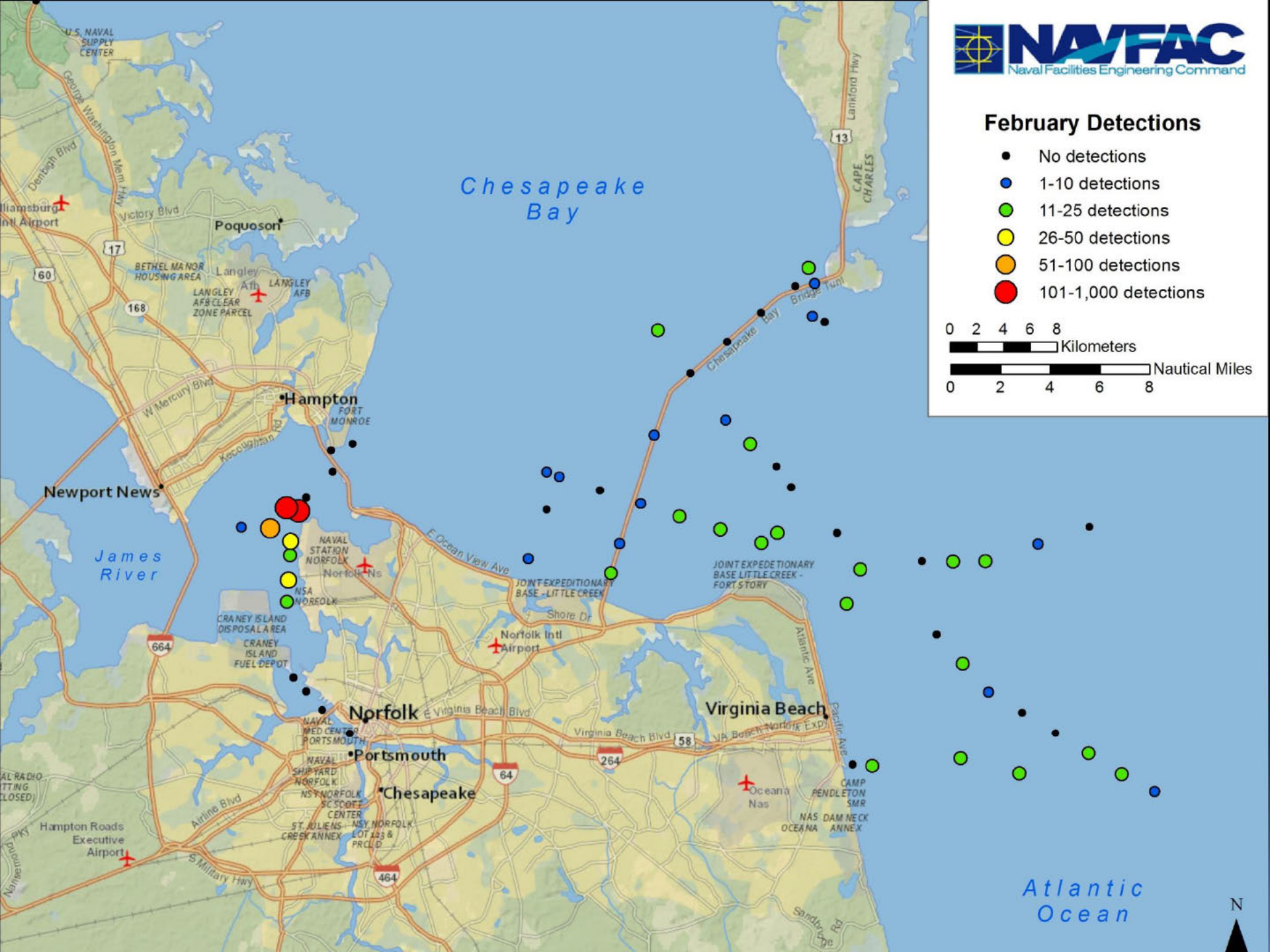
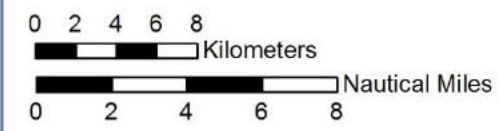


VEMCO Receiver Array in the Lower
Chesapeake Bay and Tributaries



February Detections

- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections



March Detections

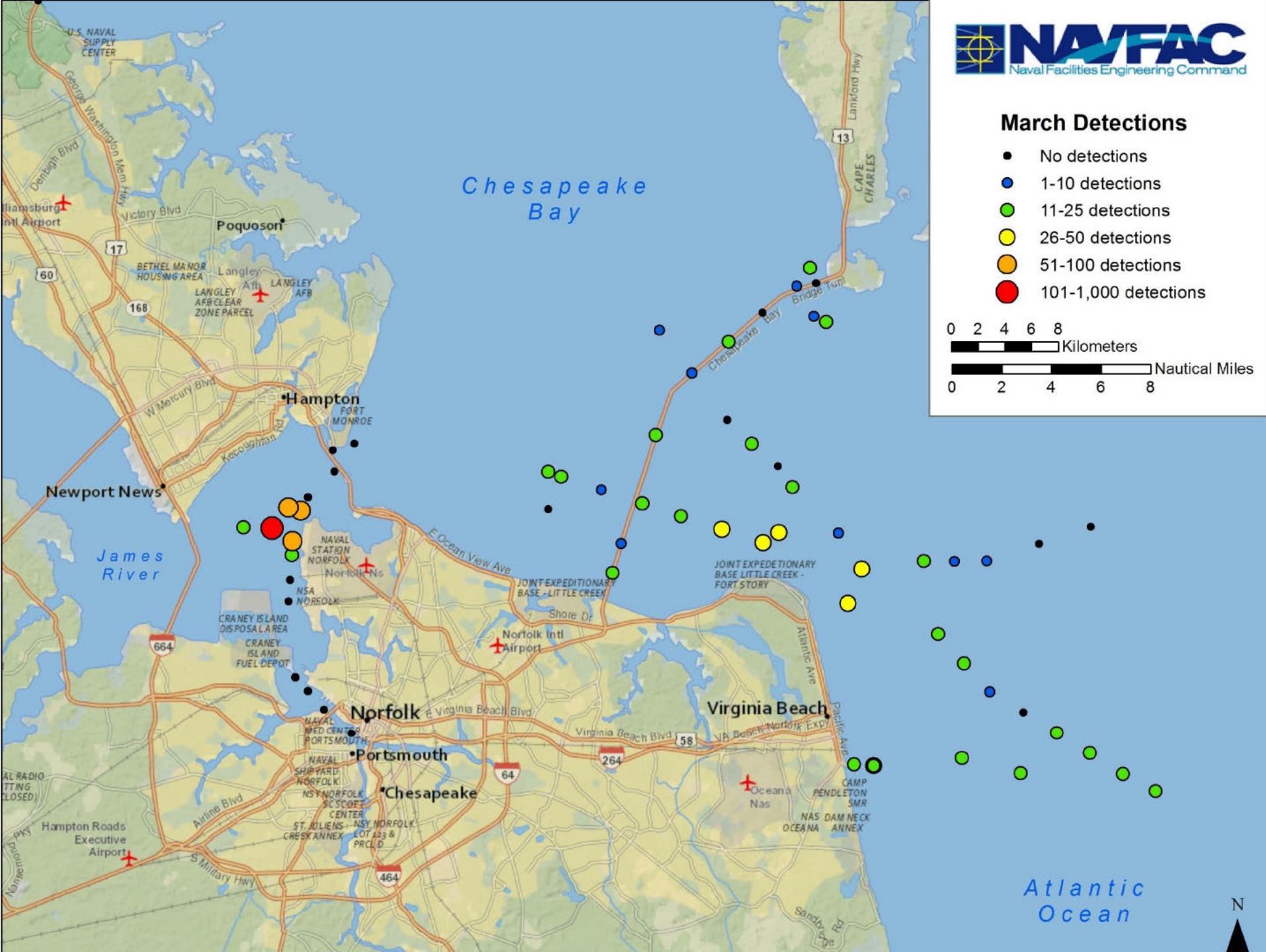
- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

Kilometers

0 2 4 6 8

Nautical Miles



April Detections

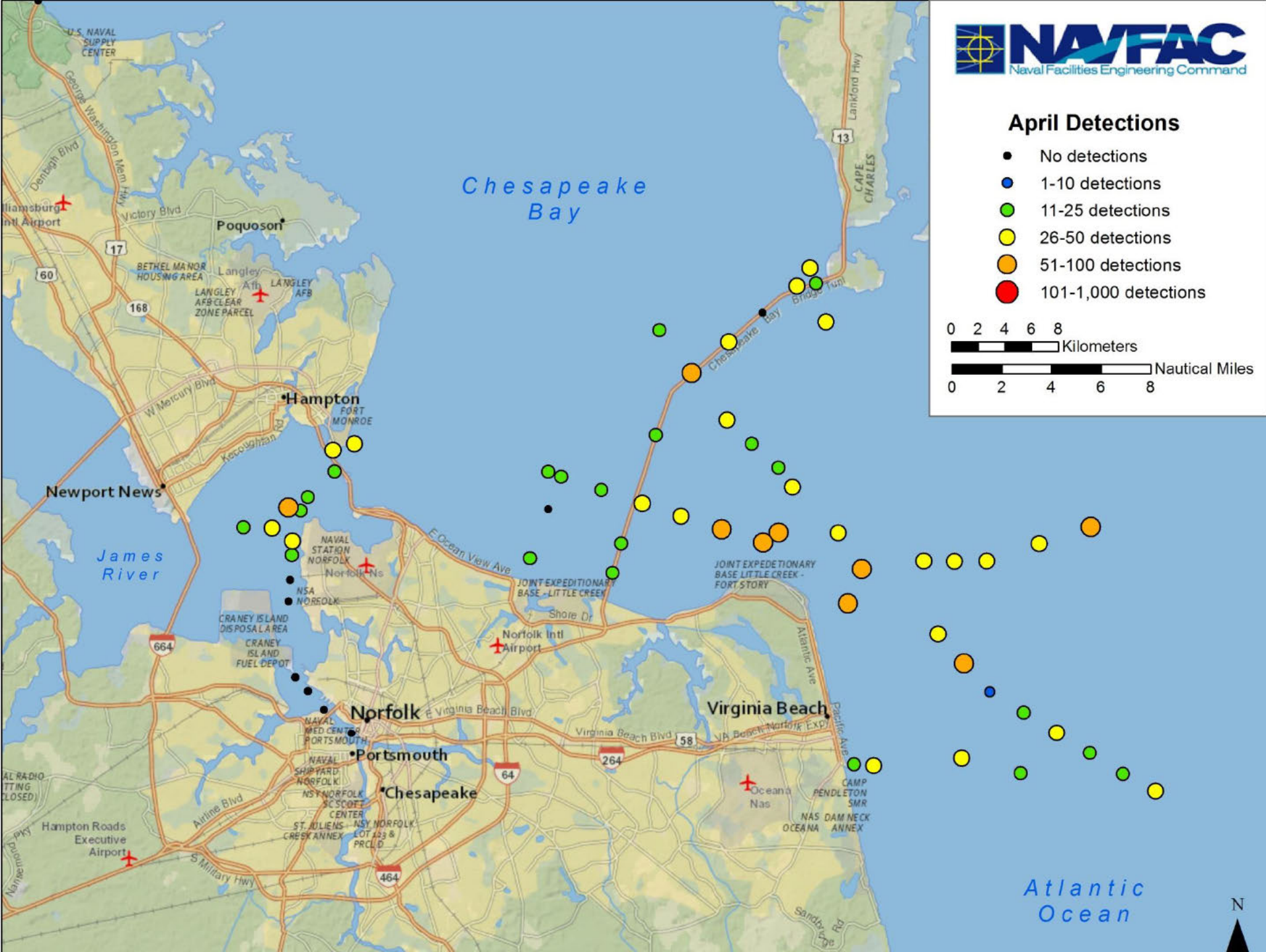
- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

Kilometers

0 2 4 6 8

Nautical Miles



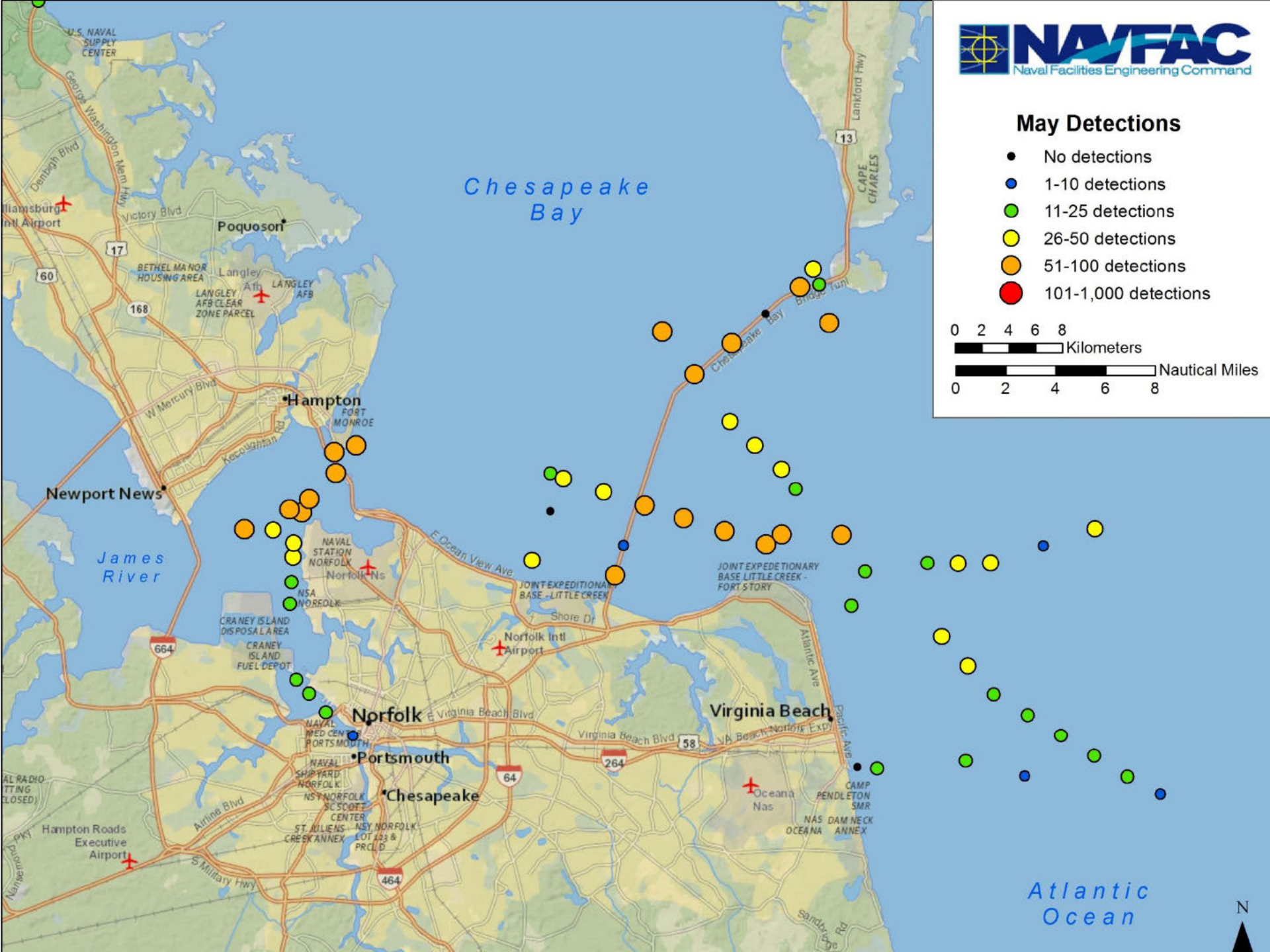
May Detections

- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

Kilometers

0 2 4 6 8
Nautical Miles



June Detections

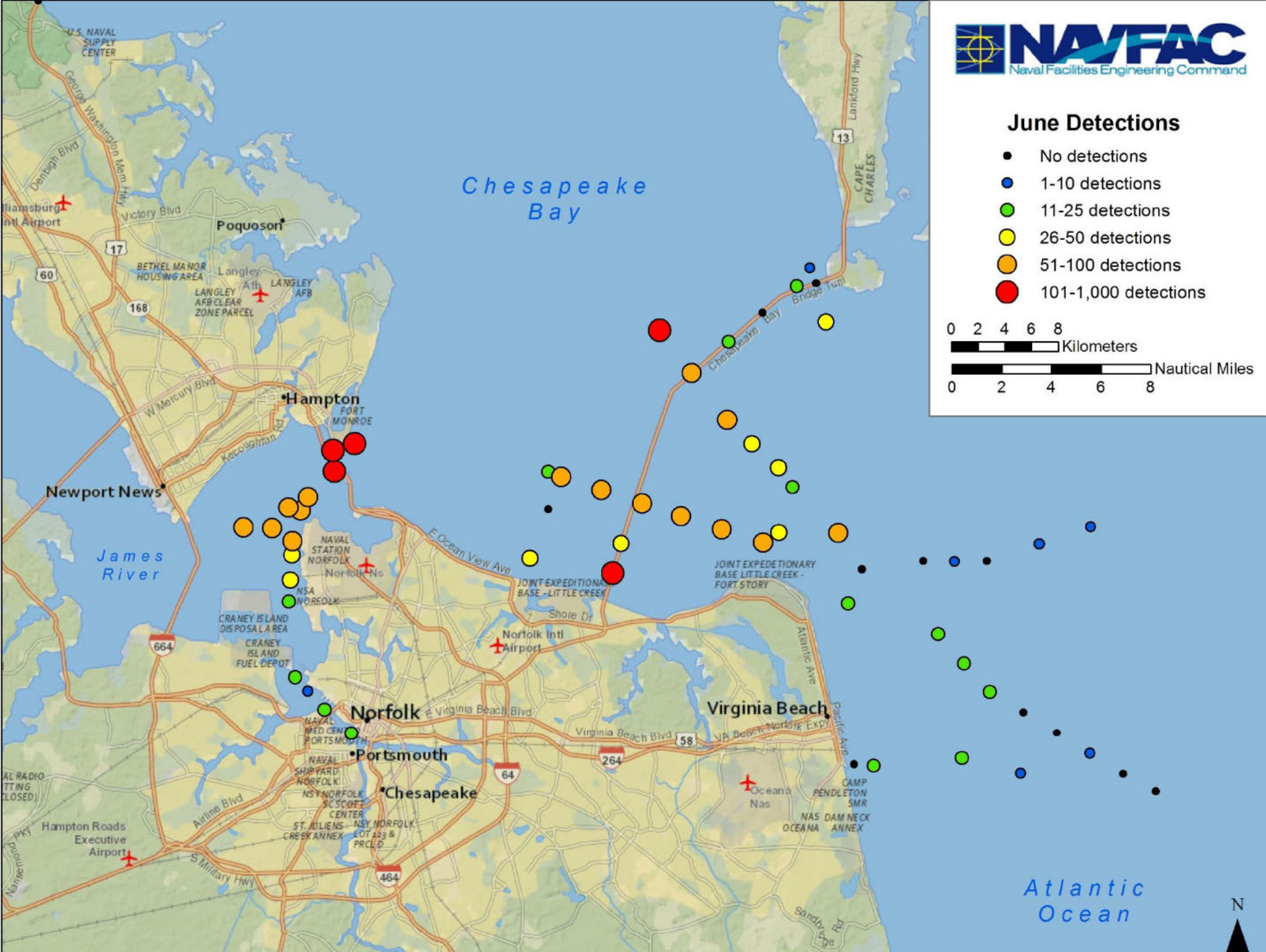
- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

Kilometers

0 2 4 6 8

Nautical Miles



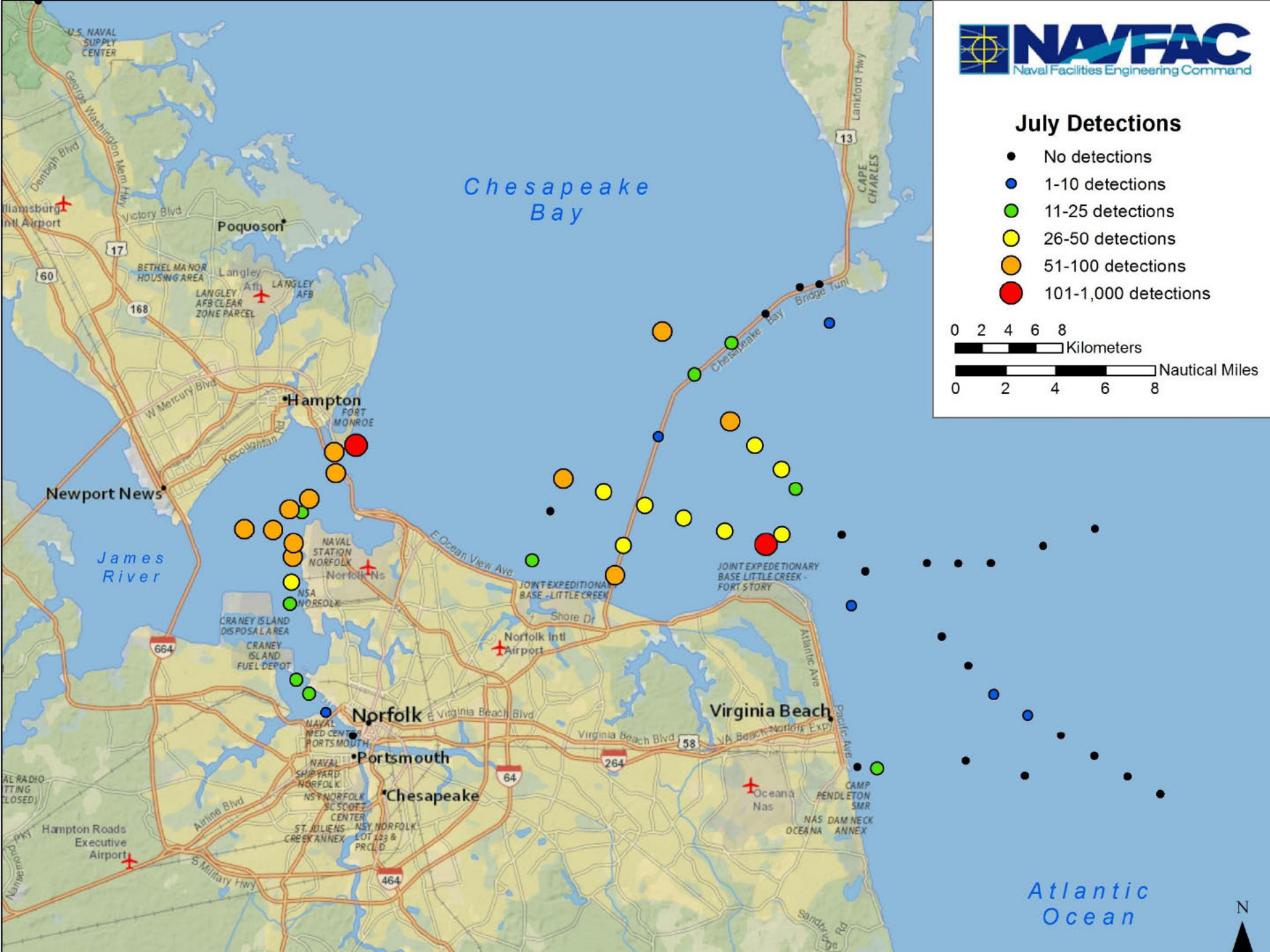
July Detections

- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

Kilometers

0 2 4 6 8 Nautical Miles



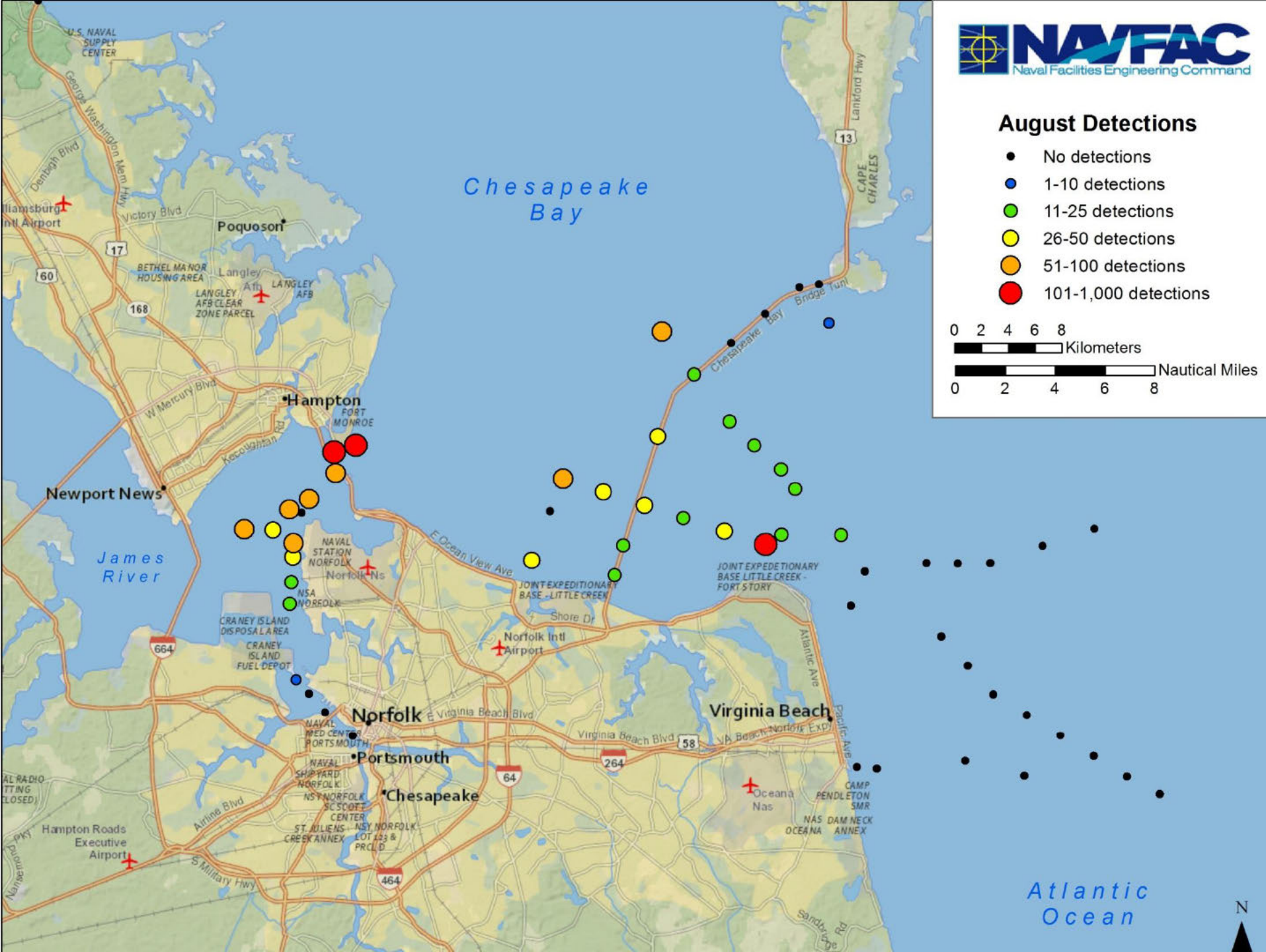
August Detections

- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

Kilometers

0 2 4 6 8 Nautical Miles



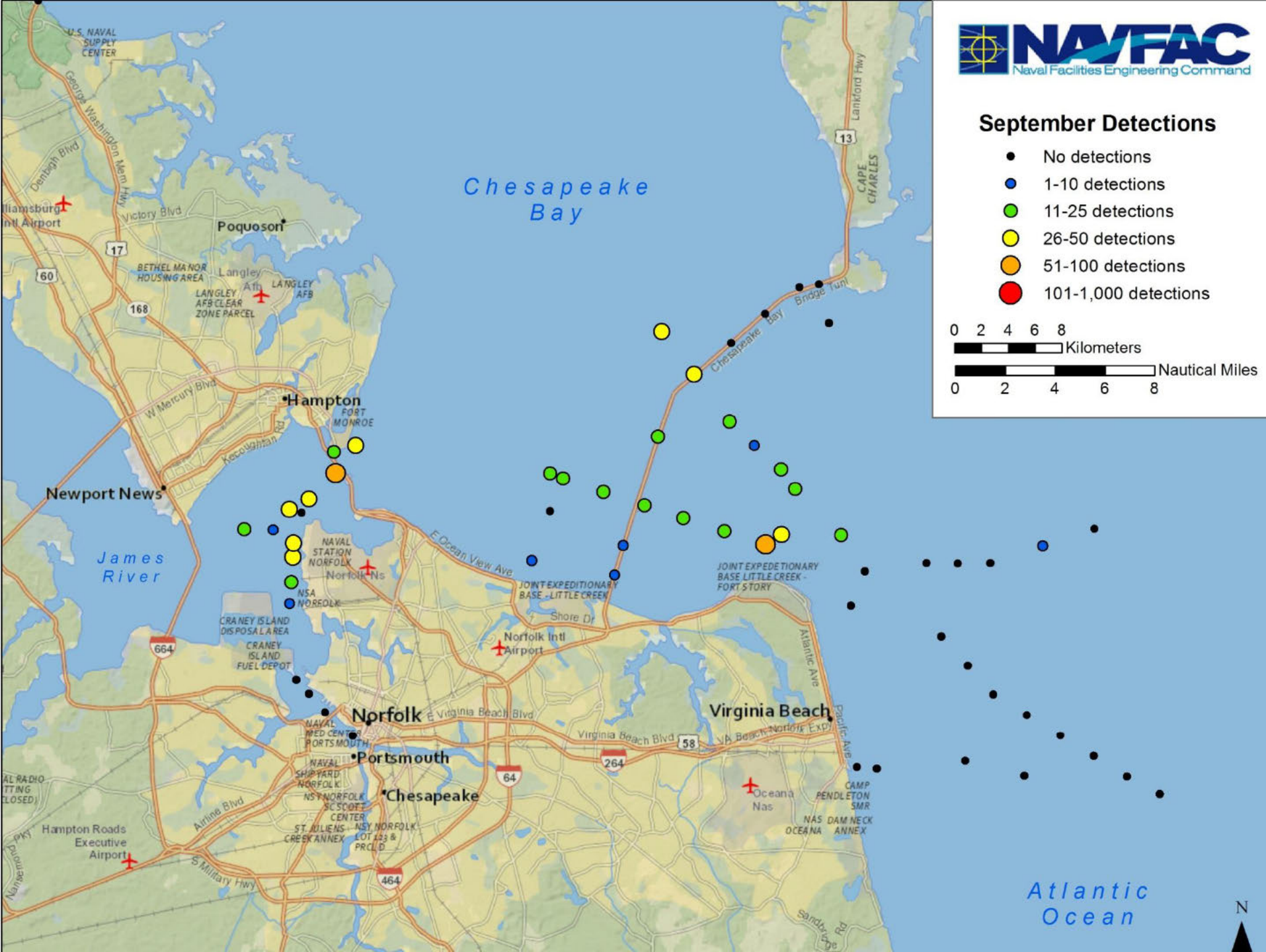
September Detections

- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

Kilometers

0 2 4 6 8
Nautical Miles



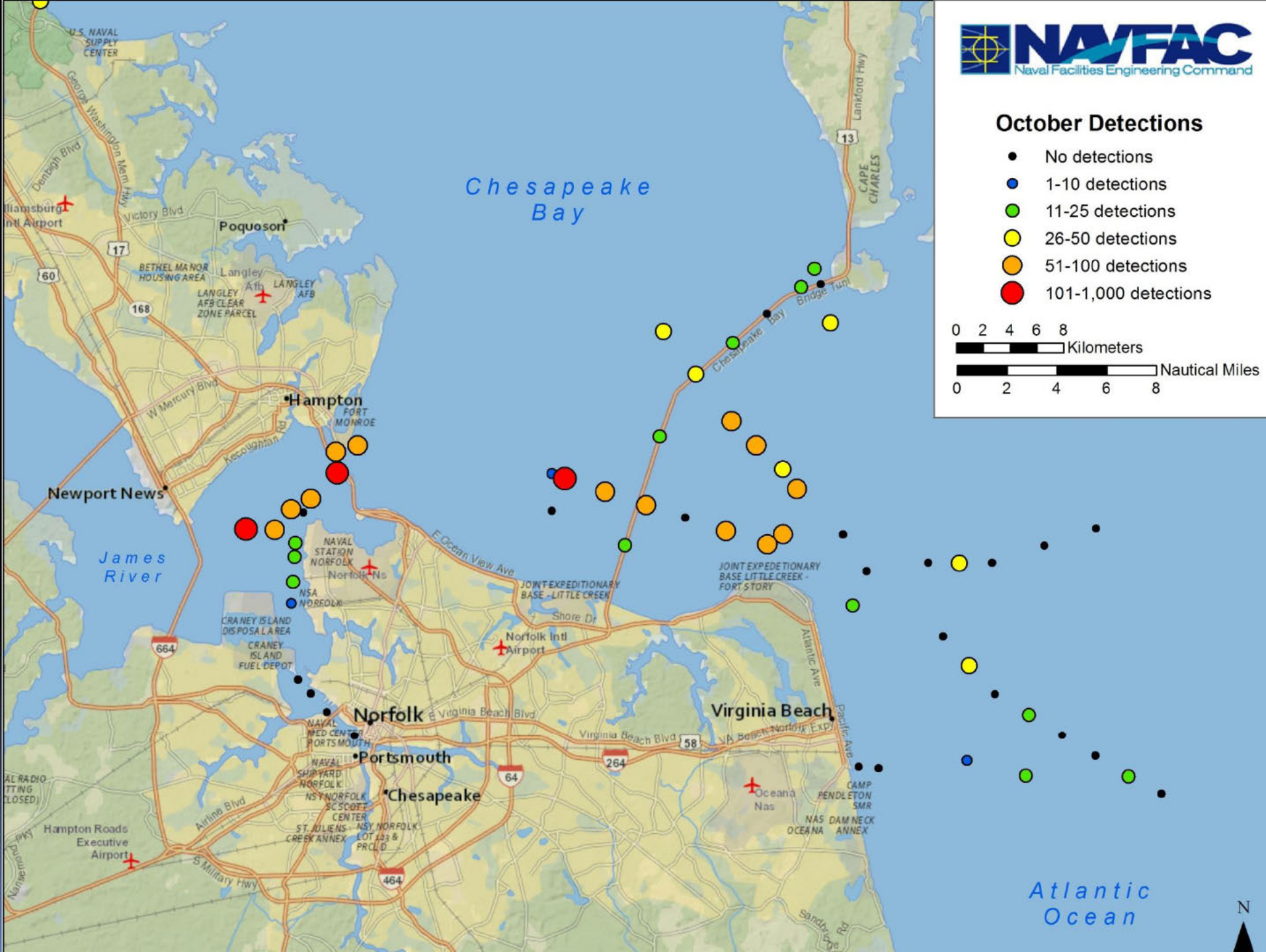
October Detections

- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

Kilometers

0 2 4 6 8
Nautical Miles



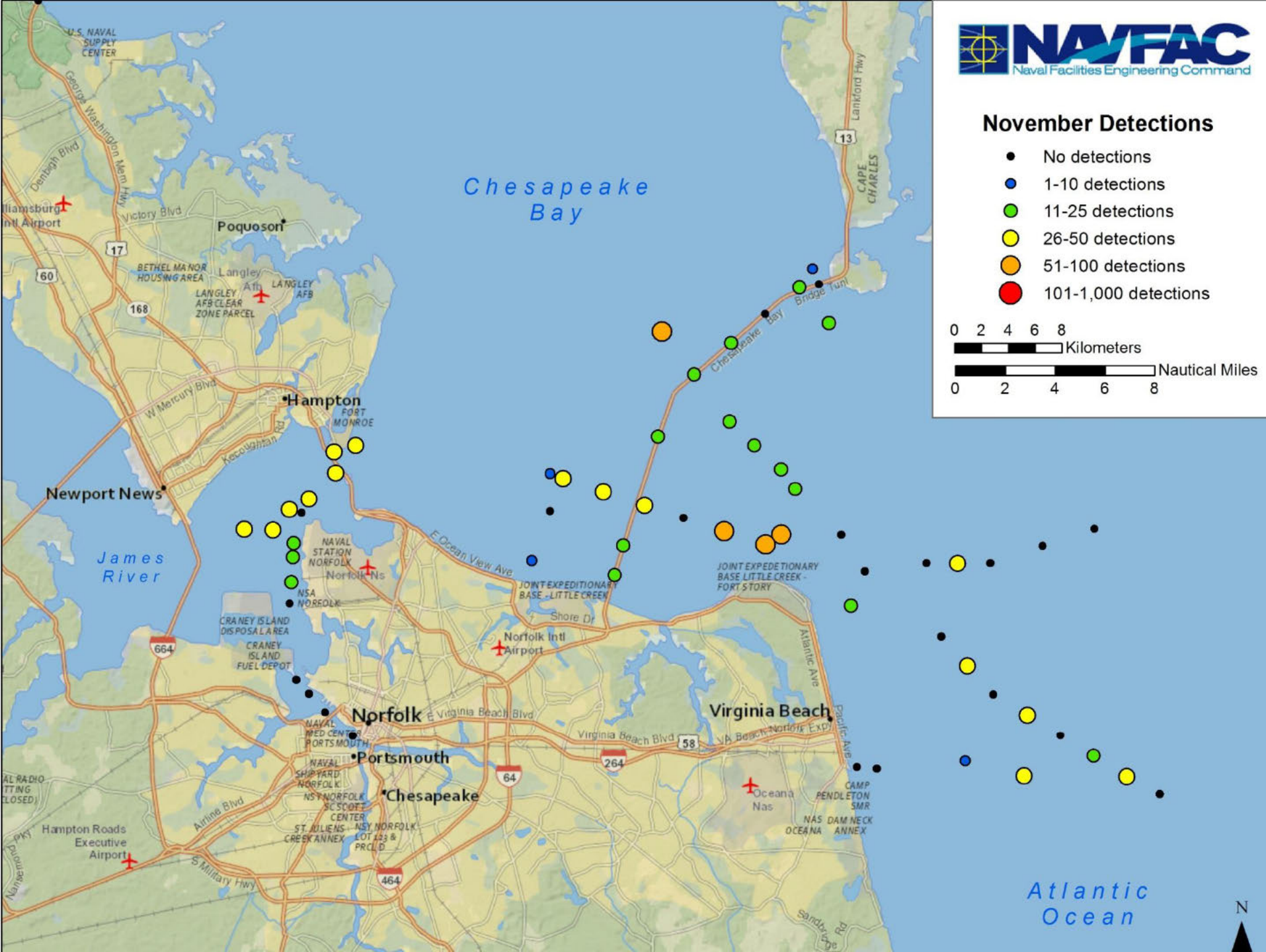
November Detections

- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

0 2 4 6 8

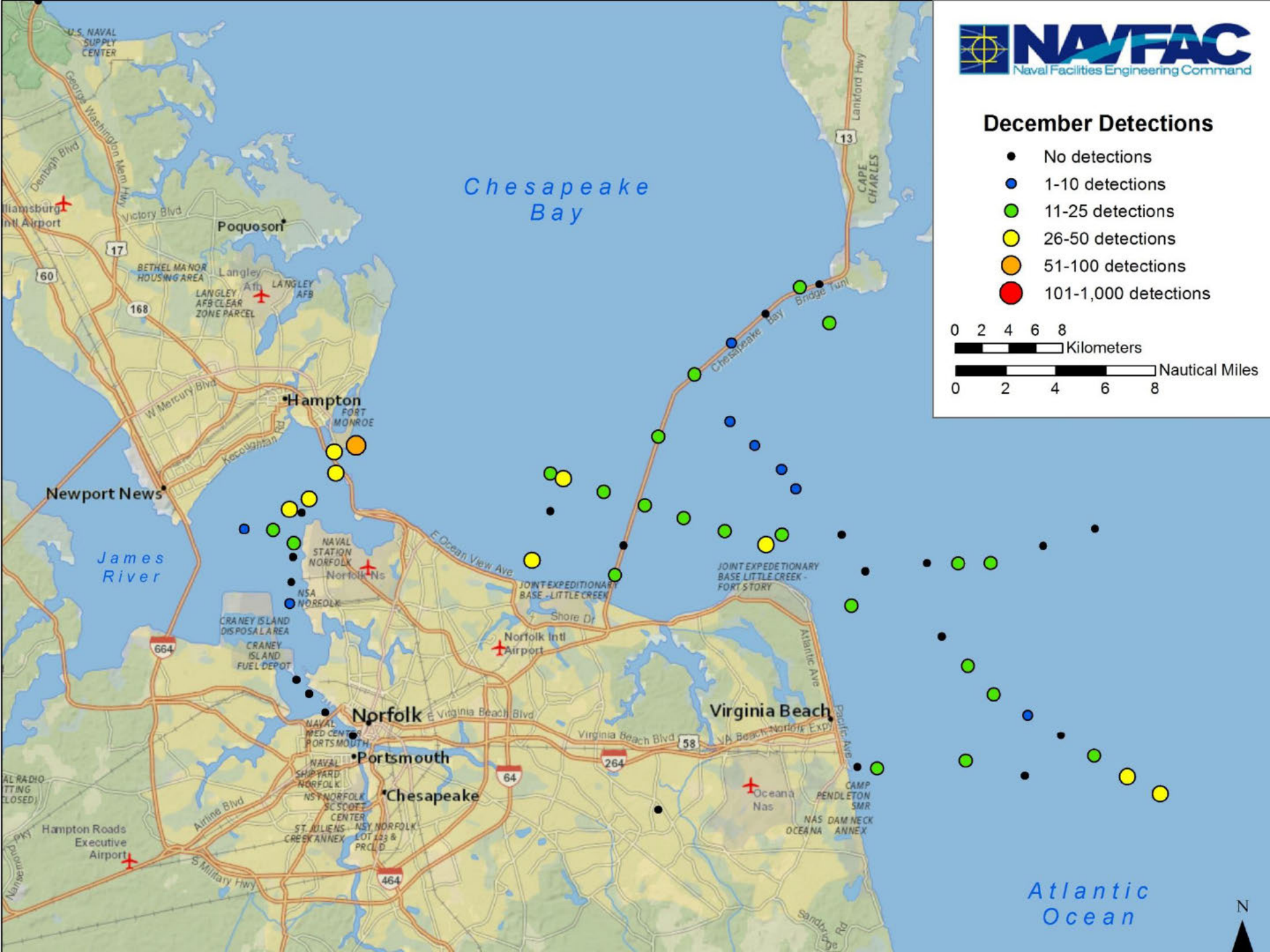
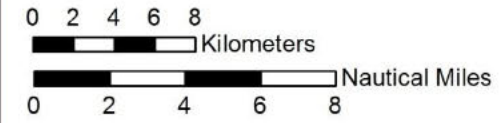
Kilometers

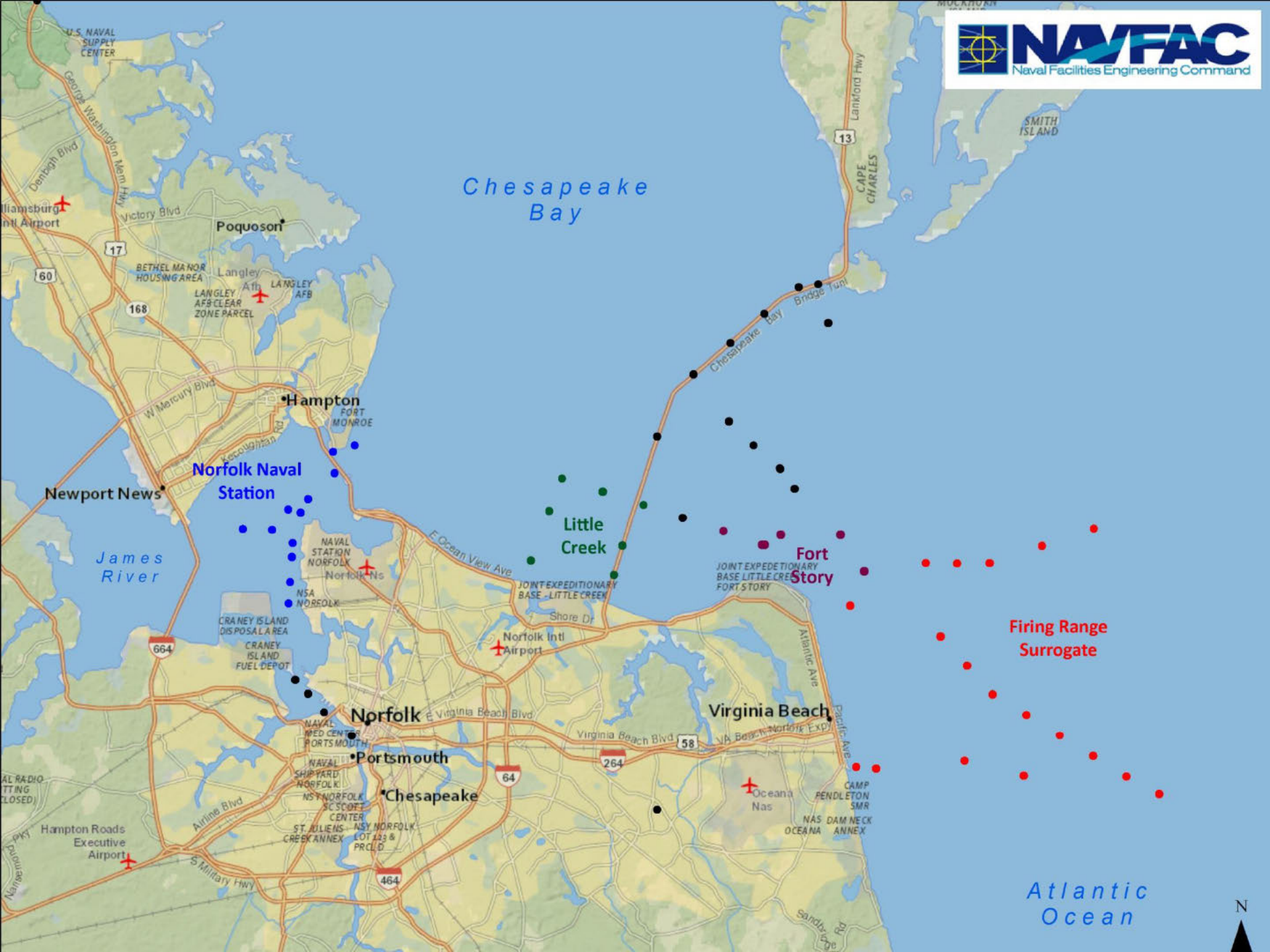
0 2 4 6 8
Nautical Miles



December Detections

- No detections
- 1-10 detections
- 11-25 detections
- 26-50 detections
- 51-100 detections
- 101-1,000 detections

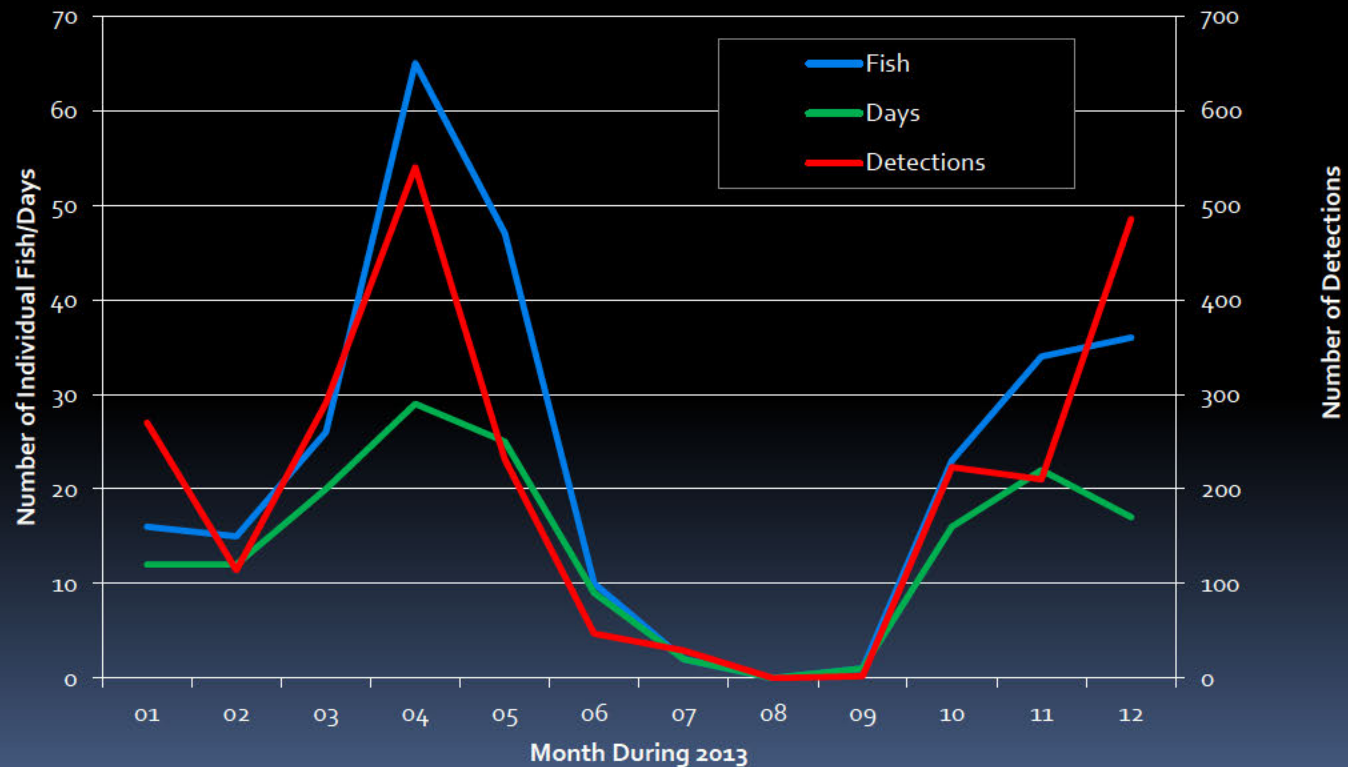






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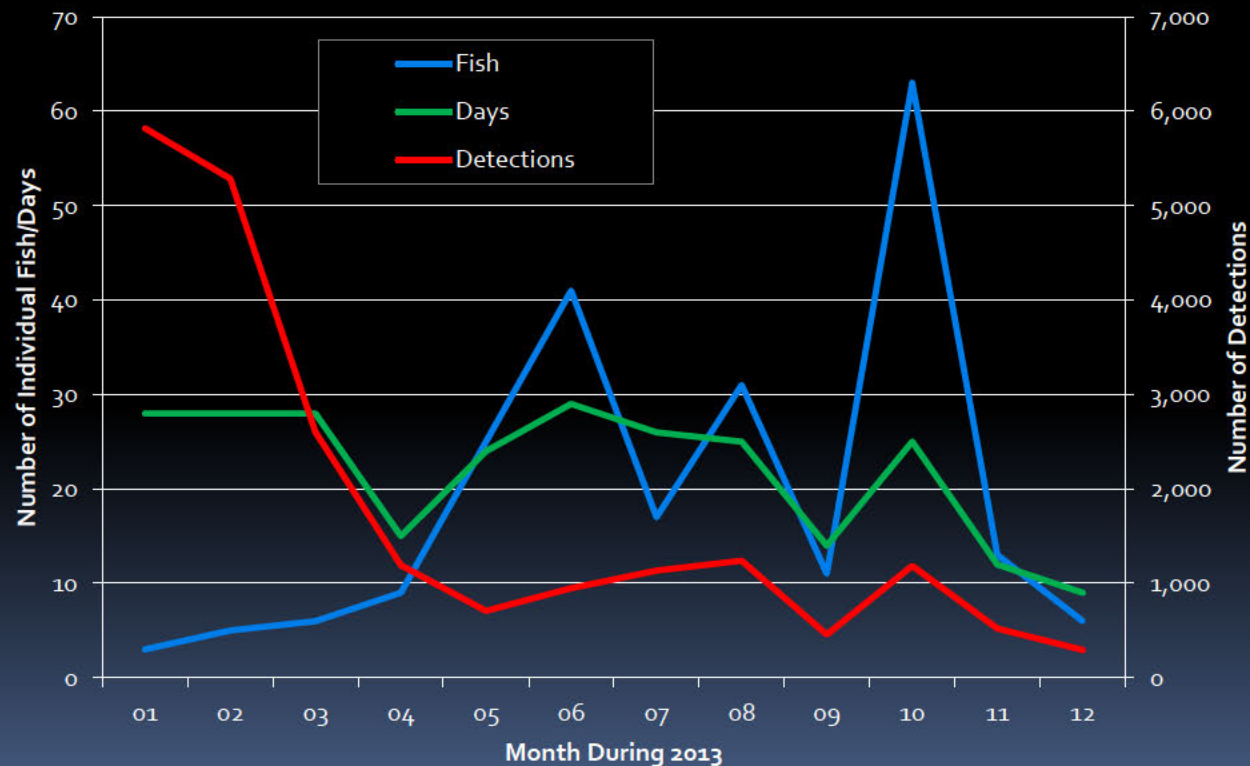
Atlantic Sturgeon Occurrence at the Firing Range





NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

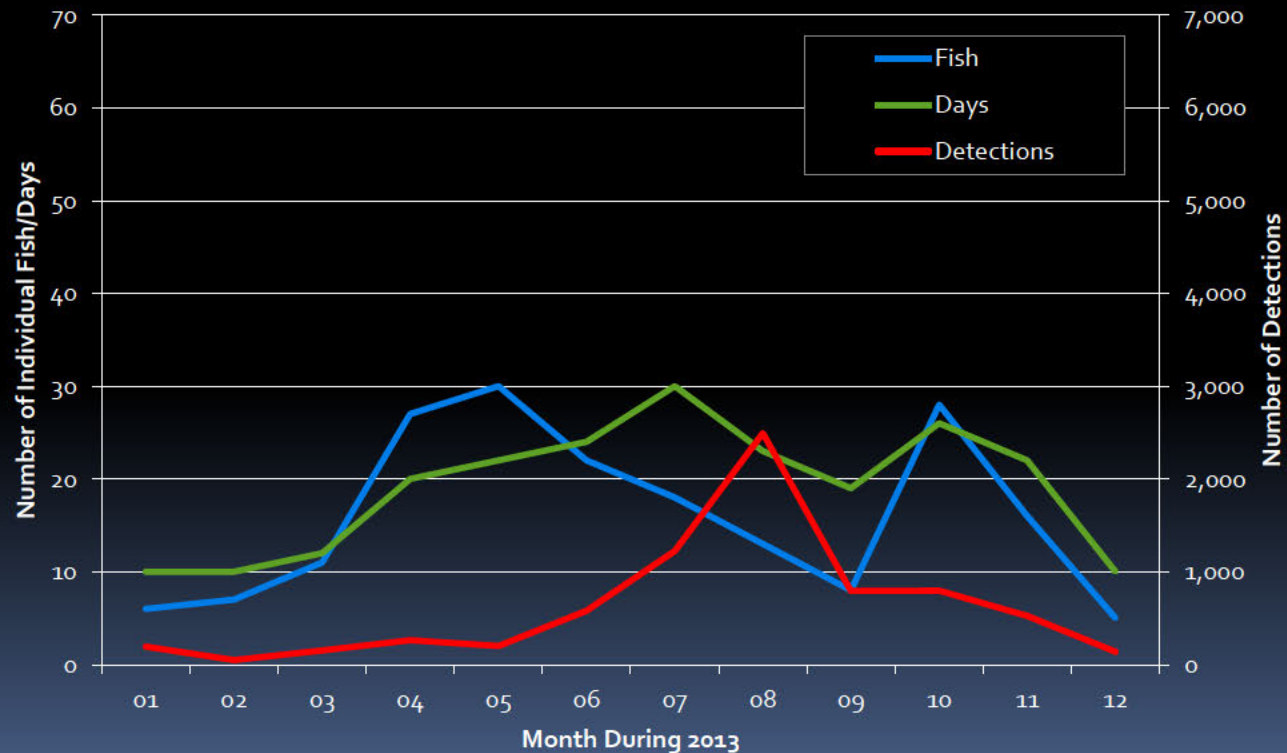
Atlantic Sturgeon Occurrence at
Norfolk Naval Base





NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

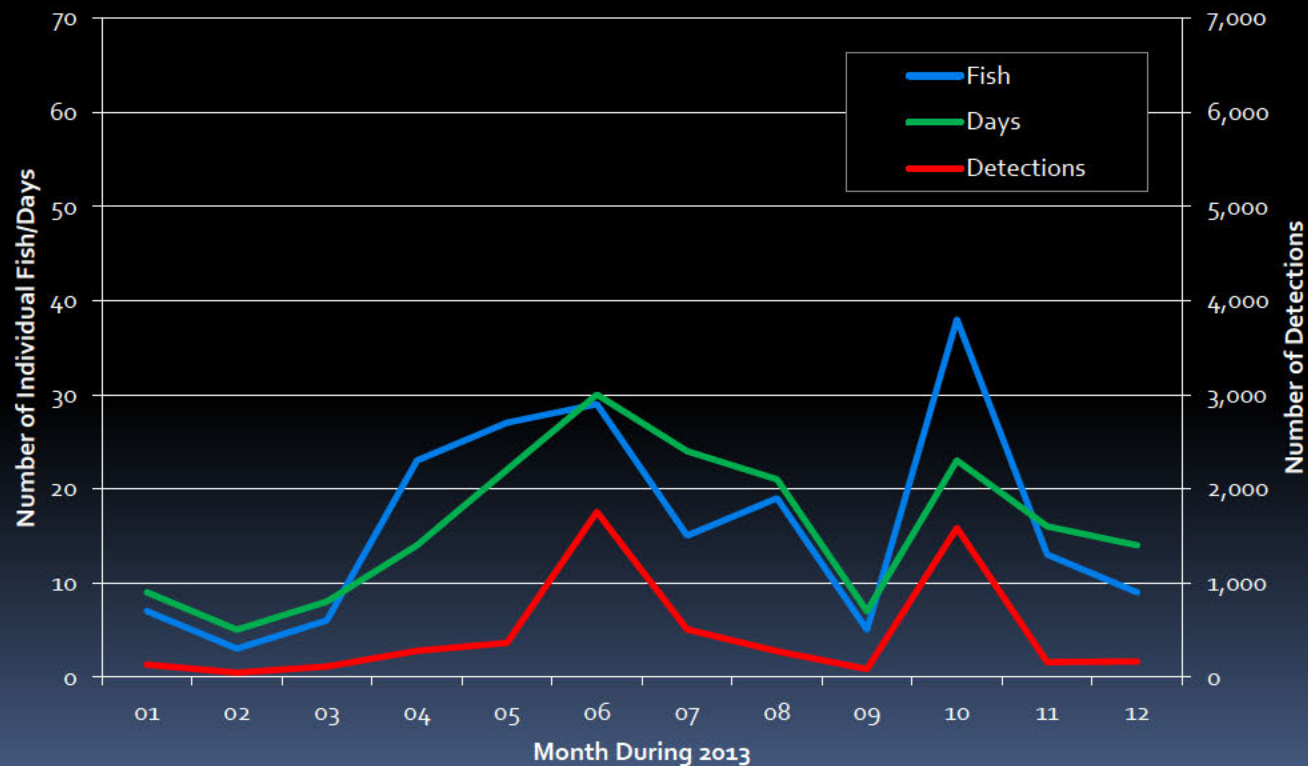
Atlantic Sturgeon Occurrence at Fort Story





NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

Atlantic Sturgeon Occurrence at Little Creek





NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

The data collected from the array will enable the Navy to determine:

- **When sturgeon are present within the Bay**
- **What areas of the Bay they are utilizing**
- **How long sturgeon are staying at any given location within the Bay**
- **Their seasonal movement patterns**
- **Areas and periods of overlap between the Navy's and the sturgeon's use of the Bay**



NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

From December 2012 through January 2014 the Navy's Chesapeake Bay receiver array had 156,545 detections of 679 individual fish:

<u>Species</u>	<u># of Fish Detected</u>
Atlantic sturgeon [†]	359
Black drum	2
Blueback herring*	45
Green turtle*	1
Kemp's ridley turtle*	1
Lemon shark	1
Loggerhead turtle*	7
Sand tiger shark	107
Sandbar shark	19
Spiny dogfish	7
Striped bass	18
White shark	2

* Navy tagged; [†] partially Navy tagged



NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

FEDERAL AGENCIES

- **National Aeronautics and Space Administration, Kennedy Space Center Ecological Program**
- **National Marine Fisheries Service, Office of Habitat Protection**
- **National Marine Fisheries Service, Office of Protected Resources**
- **U.S. Fish and Wildlife Service**



NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

STATE AGENCIES

- Connecticut Department of Energy and Environmental Protection
- Delaware Division of Fish and Wildlife
- District of Columbia Fisheries and Wildlife
- Maine Department of Marine Resources
- Maryland Department of Natural Resources
- Massachusetts Division of Marine Fisheries
- North Carolina Division of Marine Fisheries
- Virginia Aquarium
- Virginia Department of Game and Inland Fisheries



NAVY ACOUSTIC RECEIVER ARRAY IN THE LOWER CHESAPEAKE BAY

ACADEMIC INSTITUTIONS

- Delaware State University
- East Carolina University
- North Carolina State University
- Stony Brook University
- University of Delaware
- University of Maryland
- University of Massachusetts Dartmouth
- University of West Virginia
- Virginia Commonwealth University
- Virginia Institute of Marine Science